SEQUENCE LISTING

SEQ ID NO: 1: Nucleotide sequence of 11.5 kb PCR product amplified from chromosomal DNA of *C. jejuni* OH4384 which includes *LOS* biosynthesis locus

```
   1  aaagaatacg aatttgctaa agaggtttta aatcttagtg gtattgatga aacacatata
  61  gaattagcgc caaaatttaa tcttgaagag ctaatggctt ttacaaaaat gatggatctt
 121  atcataggaa atgatagcgg tccaacacat ttagcttttg cttaaaataa agcatctatt
 181  acgatttttg gtgcaacacc aagctaccgc aatgctttc  aaactcatat caataaaatc
 241  attgatacag gtaaaaaaat ccaaaatgcc aagcatatcg ataaaagtga tttttgtatc
 301  acgcgtatag aagagagaga tatcttcaaa cttgccaaag gcttacttaa tgaaaaatag
 361  tgatagaata tatcttagtc tttattatat tttgaaattt tttgttactt ttatgcctga
 421  ttgtatcttg cattttttag cttgattggt agcaagaatc gcttttcatc ttaacaaaaa
 481  acaccgcaaa atcatcaata caaatttgca aatctgtttt cctcaataca ctcaaaaaga
 541  acgcgataaa ttgtctttaa aaatttatga aaatttgctc caatttggga ttgattgttt
 601  gcaaaatcaa aacaccacca aagaaaaaat tctcaataaa gtaaatttca tcaatgaaaa
 661  tttcctatat gatgccctgg cttaaaagcg tcctattatc ttcacaactg cacactatgg
 721  aaactgggaa attttaagcc ttgcttatgc aattttaagc caaagtcgca cccaatttga
 781  aaaaaagtta aaaagtgaag ttatgtatga aagacaaatg ctaagtgctc taaaaaagga
 841  catagaactt attgacaaaa aaggcggtat aagacaaatg ctgcgtagaa taagattaaa
 901  gagagctttg ggaattttaa ctgatcaaga attatcaaat gggagcaagc aaagaagcaa
 961  attttttaac aaagaagtga atccctgttt atgcctataa agaaggtggt tagagttttt
1021  tgcttgatc  taaagcaaaa gattctcaaa atgcaagttt agaagaactg aagcacaaag
1081  ttgcgaagaa atgattaaaa aaagaccttg ggaatacttt ttttttcata gacgcttgc
1141  tagttataat gaggaaattt acaagggtgc aaaatgaatc cttgagtgtt taaacacaat
1201  aagcgttatt atcatcgtaa aaaatgctga gcaaactttg cttgagtgtt taaatccctt
1261  aaaagatttt gatgaaatta ttttacttaa caatgaaagt agcgataata ccctaaaaat
1321  agctaatgaa tttaaaaaag atttgctaa  tttatatatt tatcacaatg ctttatagg
1381  ttttggagct ttaaaaaatc ttgctttaag ttatgcaaaa aatgattgga tttaagcat
1441  tgatgctgat gaagtgcttg aaaatgagtg tattaaagag cttaaaaatt taaacttca
1501  agaagataat atcatcgcac ttagccgtaa aaatctctat aaaggcgaat ggataaaggc
1561  atgtggttgg
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SEQ ID NO: 1 (cont'd)

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1621 tggcctgatt atgttttgag aatttttaat aaaaatttca ctcgttttaa tgataattta
1681 gtacatgaaa gccttgtttt gccagtaata gctaaaaaaa tttatcttaa aaatggattg
1741 aagcattatt cttataagga tatctctcac ttaattgaca aaatgcagta ctactcaagt
1801 ctttgggcaa aacaaaatat acacaaaaaa agtggtgttt taaaagcaaa tttaagagct
1861 ttttggactt tttttagaaa ttattttta aaaaatggct ttttatatgg ttataaaggt
1921 tttataatta gcgtttgttc tgcattggga acatttttta aatatatgaa attatatgaa
1981 cttcaaagac aaaaaccaaa aacttgcgct ttaataataa taacttataa tcaaaaagaa
2041 cgcctaaac tagtgcttga tagtgttaaa aatctagcct tttacccaa tgaagtttta
2101 atcgcagatg atggtagcaa agaagataca gcaaggctta ttgaagaata tcaaaaagat
2161 tttccttgtc ctttaaaaca catttggcaa gaagatgaag ggtttaaact tagtaaaagt
2221 cgcaacaaaa ctataaaaaa cgctgatagt gaatatataa tagttattga tggtgtatgg
2281 atttggaaa aagattcat aaaagaacat ttagaatttg cacaaagaaa gctttttta
2341 caaggttcaa gagtaatttt aaataaaaaa gaaagcgaag aaattttaaa caagatgat
2401 tatcgcataa ttttaataa aaagattctt aaaagttcta aaaattcttt tttagctaaa
2461 atattttaca gtctttcaaa aaaagatga aaaaatcttt taaaaaacca ctcttattaa
2521 agtattagg ggttgcaata tgagtttttt taaaactgat tttgatgttt ttgatggttt
2581 taatgaaaat tttattggtt ggggtagaga agatagtgaa tttgttgcta gattttttatt
2641 taataaaggc attttttagac gattaaaatt taaagctatt gcttatcata tttatcacaa
2701 agaaaatagc aaaaaatagc ttgaaagcaa tcatcaaatt tatttagata ccatcaaaaa
2761 taaaaagatt tcttggagat aaaacatgaa gaaaataggt gtagttatac caatctataa
2821 tgtagaaaaa tatttaagag aatgtttaga tagcgttatc aatcaaactt atactaactt
2881 agaaatcata ctgtgtcaatg atggtagcac agatgaacac tcactcaata ttgcaaaaga
2941 atatacctta aagagtataaa gaataactct ttttgataag aaaaatgggg gtttaagttc
3001 agctagaaat ataggtatag aatactttag cggggaatat aattaaaaaa acaaaactca
3061 acatataaaa gaaaattctt taatagaatt tcaattggat ggtaataatc cttataatat
3121 atataaagca tataaaagct ctcaagcttt taataatgaa aaagatttaa ccaattttac
3181 ttaccctagt atagattata ttatattctt agatagtgat aattattgga aactaaactg
3241 catagaagaa tgcgttataa gaatgaaaaa tgtggatgta tgtggtttg accatgattg
3301 caccatgaa gacaatataa aaaataagca caaaaaaaca aggatgaaa tttttgattt
3361 taaaaagaa atatgcaaat ctccaaaaga atatgcaaat cgagcattaa gtgtaggatc
3421 tagagatatt tcttttggat ggaatggaat gattgatttt aattttttaa agcaaattaa
3481 acttaaattt ataaatttta ttatcaatga agatatacac tttgggataa tttgttttgc
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SEQ ID NO: 1 (cont'd)

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3661  tatatatgaa  actttcgggg  aaaacgctaa  ggaagcaaaa  aattatttaa  aagcagcaag
3721  cagggttata  actgctttaa  aattgataga  attttttaaa  gatcaaaaaa  acgaaaatgc
3781  acttgctata  aaagaaacat  ttttaccttg  ctatgccaaa  aaagctttaa  tgattaaaaa
3841  atttaaaagga  gatcctttaa  atttaaagga  acaattagtt  ttaattaaac  ctttattca
3901  aacaaaactt  cctatgata   tttggaaatt  ttggcaaaaa  ataaaaaata  tttaataata
3961  aaaatataaa  aattaatta   atttttaggt  ataatcacta  taattatagg  agaaaatatt
4021  ttatatgcta  tttcaatcat  acttgtgaa   aataatttgc  ttattcatcc  ctttagaaa
4081  aattagacat  aaaataaaaa  aaacattttt  actaaaaaac  atacaacgag  ataaaatcga
4141  ttcttattta  ccaaaaaaaa  ctcttgtgca  aattaataaa  tacaacaatg  aagatttaat
4201  taaacttaat  aaagctatta  taggggaggg  gcataaagga  tattttaatt  atgatgaaaa
4261  atctaaagat  ccaaaatctc  ctttgaatcc  ttgggctttt  atacgagtaa  aaaatgaagc
4321  tattacctta  aaagcttctc  ttgaaagcat  attgcctgct  atccaaagag  gtgttatagg
4381  atataatgat  tgtaccgatg  gaagtgaaga  aataattcta  gaatttttgca  aacaatatcc
4441  ttcatttata  ccaataaaat  atccttatga  aattcaaatt  caaaacccaa  aatcagaaga
4501  aaataaactc  tatagctatt  ataattatgt  tgcaagtttt  ataccaaaaag  atgagtggct
4561  tataaaaata  gatgtggatc  atatctatga  tgctaaaaaa  ctttataaaa  gcttctatat
4621  accaaaaaac  aaatatgatg  tagttagtta  ttcaagggtt  gatattcact  attttaatga
4681  taatttttt   ctttgtaaag  ataataatgg  caatatattg  aaagaaccag  gagattgctt
4741  gcttatcaat  aattataact  taaaatggaa  agaagtatta  attgacagaa  tcaataacaa
4801  ttggaaaaaa  gcaacaaaac  aaagtttttc  ttcaaatata  cactccttag  agcaattaaa
4861  gtataaacac  aggatattat  ttcacactga  attaaataat  tatcatttttc  cttttttaa
4921  aaaacataga  gctcaagata  tttataaata  taattggata  agtattgaag  aatttaaaaa
4981  attctattta  caaaatatta  atcataaaat  agaaccttct  atgatttcaa  aagaaactct
5041  aaaaaaaata  ttcttaacat  tgtttttaaa  attttttata  tttaaataaa  attttttaaag
5101  ttaaaatatt  tattttagct  aataatgtaa  ccattaattt  tgttcttttt  atttttatata
5161  tttgaatata  tagcaaatat  ttaattagca  catagagaac  gctacaatac  ttgtttttaaa
5221  tataattttg  ccttaaatag  tttaaaacca  actgcaactc  ttgaatatta  ttttttaacaa
5281  gcacttcatt  cttagtatta  caaattgaat  tattattagg  cacgtaatga  tataaattac
5341  agttccatata  tgctatttt   ttaacattgg  ataatataac  ataatataaac  aatacatctt
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SEQ ID NO: 1 (cont'd)

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5521  tttttacaaa ctcttttttg ctataaaaac cagaattaaa gtcaaacttt ttatatgaaa
5581  taacattact ttcaacaata gcattgaaaa acactaaatc aacttcatcc tgttcatcta
5641  aaatttttat acactcttca caagcattta gttccaaata atcatcagga tctaaaaaca
5701  ttatataagg agagtttgct actttcacac cttcatatct tgctcctaaa agacctaagt
5761  ttttttcatt gtggattatt tttattcttt tgtctttttt agagtattct ttggctatat
5821  ttatactatt atcatttcca caatcatcaa ctacaattat ttctatatct ttaaaagtct
5881  gattgataca gctttctatt gccctgcta  tatattgttc cacattataa gttggtaaga
5941  tgattgaaat tttaaacata tttattcctt attttattat aattaatta  taacataaaa
6001  tctattttga taaaatcgtt aaaaataaat cttgatggaa aataatcatg aaaaaagtta
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6241  taatccaaaa tcaagaatat gagaccgaac taattatgtg ttctaattac aaccagctc
6301  atctagaaaa tgaaaatttt gtaaaaactt tttacgatta tttttcctgat gctcattgg
6361  gatatgattt tttcaaacaa cttaaagatt ttaatgctta tttttaaattt cacgaaattt
6421  atttcaatca aagaattacc tcagggtct  atatgtgtgc agtagccata gccctaggat
6481  acaaagaaat ttatctttcg ggaattgatt tttatcaaaa tgggtcatct tatgctttg
6541  atactaaaca aaaaatctt  ttaaaattgg ctcctaattt taaaaatgat aattcacact
6601  atatcggaca tagtaaaaat acagatataa aagctttaga atttctagaa aaaacttaca
6661  aaataaaact atattgctta aagctttagc gtcttttagc aaattttata gaactagcgc
6721  caaatttaaa ttcaaatttt tgtcctaaca atcatacaag ctacactaaa gatatactca
6781  taccttctag tgaggcttat atcatacaag ggaaaatttt taatttaaa  aaaataaaaa
6841  ttaaagaaaa tatttattac aagttgataa aagatctatt aagattacct agtgatataa
6901  agcattattt caaggaaaa  taaatgaaag aaataaaaat acaaaatata atcataagtg
6961  aagaaaaagc acccttagtc gtgcctgaaa taggcattaa tcataatggc agtttagaac
7021  tagctaaaat tatggtagat gcagccttta gcacaggtgc taagattata aagcatcaaa
7081  cccacatcgt tgaagatgag atgagtaagg ccgctaaaaa agtaattcct ggtaatgcaa
7141  aaataagcat ttatgagatt atgcaaaaat gtgctttaga ttataaagat gagctagcac
7201  ttaaagaata cacagaaaaa ttaggtcttg tttatctttg cacaccctttt tctcgtgcag
7261  gtgcaaaccg cttagaagat atgggagtta gtgctttaa  gattggttca ggtgagtgta
7321  ataattatcc gcttattaaa cacatagcag cctttaaaaa gcctatgata gttagcacag
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SEQ ID NO: 1 (cont'd)

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7501 acgctatgct tgaattaaaa aaagaatttt cctgtatggt aggcttaagc gaccacacaa
7561 cagataatct tgcgtgttta ggtgcggttg cacttggtgc ttgtgtgctt gaaagacatt
7621 ttactgatag tatgcataga agtggccctg atatagtttg ttctatggat acacaggctt
7681 taaaagagct tattatacaa agtgagcaaa tggctataat gagaggaaat aatgaaagta
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7861 gacttggtgg aattagtgca gctgaatttg aaaatatttt aggcaaaaaa gcattaagag
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7981 aacaggcact agggctgatt atcctaagat taaatcttta atgtacaggg tgcaaaactc
8041 aagcgaattt gaactttaca tctttgcaac aggaatgcac ttaagcaaaa atttggcta
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8161 taaatatttt tcaaccgata aggctttagc cactacaatt gatggatttt caagatatgt
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8461 tatcataggt tcgcctgatt tagaactttt aaacgataat aaaatttcac ttaatgaagc
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8581 aactgaaatt acaagcatta aaaatcaagc agataattta gtaaaagcac tgatacaaag
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8821 aaaagaggcc ttatacttaa aaacagcagg aattttagtt ggctcaaggc aaaatggaag
8881 acttggcaat gaaaatacac taaaagttaa tgcaaatagt gatgaaatac taaaagctat
8941 taataccatt cataaaaaac aagatttatt tagcgccaag ttagagatt tagatagctc
9001 aaaattattt tttgaatatt tacaaagcgg agaattttt aaacttaaca cacaaaaagt
9061 ttttaaggat ataaaatgag cttagcaata atccctgctc gtgggctc aaagggtatt
9121 aaaaataaaa atttggtttt attaaacaat aaacctttaa tttattacac cattaaagct
9181 gcactaaata ctaaaagcat tagtaaagtt gttgtaagca gtgatagtga tgaaatttta
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SEQ ID NO: 1 (cont'd)

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9301   aatactacaa gcgataaagt gctttacat  gctctaaaat tttacaaaga ttatgaagat
9361   gtagtttttt tacaacccac ttcgccgcta agaacaaata ttcatattga tgaggctttt
9421   aatctttata aaaatagcaa tgcaaatgcc ctaattagcg taagcgaatg tgataataaa
9481   atctaaaaag cctttgtttg taatgaatat ggcgatttag caggatttg  taatgatgaa
9541   tatcccttta tgccaaggca aaaattgcct aaaacatata tgagcaatgg tgcaatttat
9601   atttttaaga taaaagaatt tttaaacaat cctagctttt tacaaagcaa aaccaagcat
9661   tttttaatgg atgaaagctc aagtttagat attgactgtt tggaggattt aaaaaaggct
9721   gaacagatat ggaaaaaata accttaaaat gcaataaaat tatattaaat ttattaaagc
9781   aatataatat ttatacaaaa acttatatag aaaatcctag aagattttca agactaaaaa
9841   ccaaagattt tataaccttt ccattggaaa acaatcaact agagagtgta gcggggctgg
9901   ggatagaaga atattgtgct tttaaattta gcaatatctt acatgaaatg gattcatttt
9961   cttttagcgg atctttccta cctcattata caaagttgg  aagtattgt  tcaatttctg

10021  atggggtttc tatgtttaac tttcaacatc ctatggatag aatcagcact gcaagtttta
10081  cctatgaaac aaatcatagt tttattaacg atgcttgcca aaatcacatc aacaaaacat
10141  ttcctatagt taaccataat ccaagctcat caataacgca tttaattata caagatgatg
10201  tttggatagg aaaagatgtt ttgcttaaac agggtatcac acttgggact ggatgtgtca
10261  taggacaaag agctgtagtt actaaagatg taccacctta tgctatagtt gcaggaattc
10321  cagccaaaat tatcaaatat agatttgatg aaaaaacaat agaaagatta ttaaaaattc
10381  aatggtggaa atatcatttt gctgatttt  atgatattga tcttaattga aaaataaacc
10441  aatatccttga cctactagaa gaaaaaatca taaaaaaatc aatttcctac tataatccaa
10501  ataaacttta tttttagagat atttttagaac taaaatcaaa aaaattttt  aatctatttt
10561  aatctatttt tcacccctgc ttcctctctc tttaaaactt caaataattt ctgatgaaat
10621  tcatcatgtg caaactcttt ggatagtttt tttatgattt cattacttt  ctttttatca
10681  tgataatttt gatttaaaat ttcttatttt ttattctcat atcttccatt tggattaaat
10741  tcataatgat aaatgcaagt tttaaaaaca gctatttct  cacaaaaca  aaaataaata
10801  taacaaaaaa gcacatcttc gccataattc aaacgctcat ctattttaat tttttcaaaa
10861  cttttttaga tgtatctttt tttaaagcac ttcgcccaaa ccgaccagca aaaatgcctt
10921  tgtttgctta aaaattctaa aaattccttt tgattaaaaa cttcatcttg tttaaaacga
10981  taaattgtt  tggtttttac cctatgcaca aaggcatcaa aacaagcaa  atcaaaacct
11041  tttttcatct cttaaacgc  tatttcacaa gcatcaggtg ttaaaaaatc atcactatct
11101  aaaaacatta taaaatcaga actagaatgc aaaaccccca aatttctact tgcaaaagtg
11161  cctaaatttt cttcattttg aaagatttt  attcttggat cttttttgc  aaattctaaa
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6

SEQ ID NO: 1 (cont'd)

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11221 accatattta aactattatc tttactttta tcatcgataa tcaaaatttc aatatctttt
11281 aaagtctgat ttatacaact ttgcaaagct cttgagataa aatcgcaaga attaaaaagc
11341 gggattatga tagaaagttg tggcatattt ttcctaaatt ttgttaaaat aataaaaaca
11401 attctatcaa agtttaggaa atttatgaaa attttatac accttccaac ctggttaggc
11461 gatacggtaa tggc
```

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SEQ ID NO: 2: Nucleotide sequence that encodes bifunctional sialyltransferase *cstII* from
C. jejuni strain OH4384 (ORF 7a of *LOS* biosynthesis locus)

```
ATGAAAAAAG TTATTATTGC TGGAAATGGA CCAAGTTTAA AAGAAATTGA    50
TTATTCAAGA CTACCAAATG ATTTTGATGT ATTTAGATGT AATCAATTTT   100
ATTTTGAAGA TAAATACTAT CTTGGTAAAA AATGCAAGGC AGTATTTTAC   150
AATCCTATTC TTTTTTTTGA ACAATACTAC ACTTTAAAAC ATTTAATCCA   200
AAATCAAGAA TATGAGACCG AACTAATTAT GTGTTCTAAT TACAACCAAG   250
CTCATCTAGA AAATGAAAAT TTTGTAAAAA CTTTTTACGA TTATTTTCCT   300
GATGCTCATT TGGGATATGA TTTTTTCAAA CAACTTAAAG ATTTTAATGC   350
TTATTTTAAA TTTCACGAAA TTTATTTCAA TCAAAGAATT ACCTCAGGGG   400
TTTATATGTG TGCAGTAGCC ATAGCCCTAG GATACAAAGA AATTTATCTT   450
TCGGGAATTG ATTTTTATCA AAATGGGTCA TCTTATGCTT TTGATACTAA   500
ACAAAAAAAT CTTTTAAAAT TGGCTCCTAA TTTTAAAAAT GATAATTCAC   550
ACTATATCGG ACATAGTAAA AATACAGATA TAAAAGCTTT AGAATTTCTA   600
GAAAAAACTT ACAAAATAAA ACTATATTGC TTATGTCCTA ACAGTCTTTT   650
AGCAAATTTT ATAGAACTAG CGCCAAATTT AAATTCAAAT TTTATCATAC   700
AAGAAAAAAA ·TAACTACACT AAAGATATAC TCATACCTTC TAGTGAGGCT   750
TATGGAAAAT TTTCAAAAAA TATTAATTTT AAAAAAATAA AAATTAAAGA   800
AAATATTTAT TACAAGTTGA TAAAAGATCT ATTAAGATTA CCTAGTGATA   850
TAAAGCATTA TTTCAAAGGA AAATAA                             876
```

SEQ ID NO: 3:   Amino acid sequence of bifunctional sialyltransferase *CstII* from *C. jejuni*
strain OH4384 (encoded by ORF 7a of *LOS* biosynthesis locus)

```
              10         20         30         40         50
  1 MKKVIIAGNG PSLKEIDYSR LPNDFDVFRC NQFYFEDKYY LGKKCKAVFY
 51 NPILFFEQYY TLKHLIQNQE YETELIMCSN YNQAHLENEN FVKTFYDYFP
101 DAHLGYDFFK QLKDFNAYFK FHEIYFNQRI TSGVYMCAVA IALGYKEIYL
151 SGIDFYQNGS SYAFDTKQKN LLKLAPNFKN DNSHYIGHSK NTDIKALEFL
201 EKTYKIKLYC LCPNSLLANF IELAPNLNSN FIIQEKNNYT KDILIPSSEA
251 YGKFSKNINF KKIKIKENIY YKLIKDLLRL PSDIKHYFKG K
```

SEQ ID NO: 4.   Nucleotide sequence of bifunctional sialyltransferase-encoding *cstII*
(ORF7a) from *LOS* biosynthesis locus of *C. jejuni* serotype O:10

```
ATGAAAAAAG TTATTATTGC TGGAAATGGA CCAAGTTTAA AAGAAATTGA    50
TTATTCAAGG CTACCAAATG ATTTTGATGT ATTTAGATGC AATCAATTTT   100
ATTTTGAAGA TAAATACTAT CTTGGTAAAA AATTCAAAGC AGTATTTTAC   150
AATCCTGGTC TTTTTTTTGA ACAATACTAC ACTTTAAAAC ATTTAATCCA   200
AAATCAAGAA TATGAGACCG AACTAATTAT GTGTTCTAAT TACAACCAAG   250
CTCATCTAGA AAATGAAAAT TTTGTAAAAA CTTTTTACGA TTATTTTCCT   300
GATGCTCATT TGGGATATGA TTTTTTTAAA CAACTTAAAG AATTTAATGC .350
TTATTTTAAA TTTCACGAAA TTTATCTCAA TCAAAGAATT ACCTCAGGAG   400
TCTATATGTG TGCAGTAGCT ATAGCCCTAG GATACAAAGA AATTTATCTT   450
TCTGGAATTG ATTTTTATCA AAATGGGTCA TCTTATGCTT.TTGATACCAA   500
ACAAGAAAAT CTTTTAAAAC TGGCTCCTGA TTTTAAAAAT GATCGCTCAC   550
ACTATATCGG ACATAGTAAA AATACAGATA TAAAAGCTTT AGAATTTCTA   600
GAAAAAACTT ACAAAATAAA ACTATATTGC TTATGTCCTA ACAGTCTTTT   650
AGCAAATTTT ATAGAACTAG CGCCAAATTT AAATTCAAAT TTTATCATAC   700
AAGAAAAAAA TAACTACACT AAAGATATAC TCATACCTTC TAGTGAGGCT   750
```

8

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TATGGAAAAT TTTCAAAAAA TATTAATTTT AAAAAAATAA AAATTAAAGA   800
AAATATTTAT TACAAGTTGA TAAAAGATCT ATTAAGATTA CCTAGTGATA   850
TAAAGCATTA TTTCAAAGGA AAATAA                             876
```

SEQ ID NO: 5. Amino acid sequence of bifunctional sialyltransferase *cstII* encoded by ORF 7a of *LOS* biosynthesis locus from *C. jejuni* serotype O:10

```
            10         20         30         40         50
  1 MKKVIIAGNG PSLKEIDYSR LPNDFDVFRC NQFYFEDKYY LGKKFKAVFY
 51 NPGLFFEQYY TLKHLIQNQE YETELIMCSN YNQAHLENEN FVKTFYDYFP
101 DAHLGYDFFK QLKEFNAYFK FHEIYLNQRI TSGVYMCAVA IALGYKEIYL
151 SGIDFYQNGS SYAFDTKQEN LLKLAPDFKN DRSHYIGHSK NTDIKALEFL
201 EKTYKIKLYC LCPNSLLANF IELAPNLNSN FIIQEKNNYT KDILIPSSEA
251 YGKFSKNINF KKIKIKENIY YKLIKDLLRL PSDIKHYFKG K
```

SEQ ID NO: 6. Nucleotide sequence of *C. jejuni* serotype O:41 *cstII* coding region

```
ATGAAAAAAG TTATTATTGC TGGAAATGGA CCAAGTTTAA AAGAAATTGA    50
TTATTCAAGA CTACCAAATG ATTTTGATGT ATTTAGATGC AATCAATTTT   100
ATTTTGAAGA TAAATACTAT CTTGGTAAAA AATGCAAAGC AGTATTTTAC   150
AATCCTAGTC TTTTTTTTGA ACAATACTAC ACTTTAAAAC ATTTAATCCA   200
AAATCAAGAA TATGAGACCG AACTAATCAT GTGTTCTAAT TTTAACCAAG   250
CTCATCTAGA AAATCAAAAT TTTGTAAAAA CTTTTTACGA TTATTTTCCT   300
GATGCTCATT TGGGATATGA TTTTTTTCAAA CAACTTAAAG AATTCAATGC   350
TTATTTTAAA TTTCACGAAA TTTATTTCAA TCAAAGAATT ACCTCAGGGG   400
TCTATATGTG CACAGTAGCC ATAGCCCTAG GATACAAAGA AATTTATCTT   450
TCGGGAATTG ATTTTTATCA AAATGGATCA TCTTATGCTT TTGATACCAA   500
ACAAAAAAAT CTTTTAAAAT TGGCTCCTAA TTTTAAAAAT GATAATCAC    550
ACTATATCGG ACATAGTAAA AATACAGATA TAAAAGCTTT AGAATTTCTA · 600
GAAAAAACTT ACGAAATAAA GCTATATTGT TTATGTCCTA ACAGTCTTTT   650
AGCAAATTTT ATAGAACTAG CGCCAAATTT AAATTCAAAT TTTATCATAC   700
AAGAAAAAAA TAACTATACT AAAGATATAC TCATACCTTC TAGTGAGGCT   750
TATGGAAAAT TTACAAAAAA TATTAATTTT AAAAAAATAA AAATTAAAGA   800
AAATATTTAT TACAAGTTGA TAAAAGATCT ATTAAGATTA CCTAGTGATA   850
TAAAGCATTA TTTCAAAGGA AAATAA                             876
```

SEQ ID NO: 7. Amino acid sequence of *CstII* from *C. jejuni* serotype O:41

```
            10         20         30         40         50
  1 MKKVIIAGNG PSLKEIDYSR LPNDFDVFRC NQFYFEDKYY LGKKCKAVFY
 51 NPSLFFEQYY TLKHLIQNQE YETELIMCSN FNQAHLENQN FVKTFYDYFP
101 DAHLGYDFFK QLKEFNAYFK FHEIYFNQRI TSGVYMCTVA IALGYKEIYL
151 SGIDFYQNGS SYAFDTKQKN LLKLAPNFKN DNSHYIGHSK NTDIKALEFL
201 EKTYEIKLYC LCPNSLLANF IELAPNLNSN FIIQEKNNYT KDILIPSSEA
251 YGKFTKNINF KKIKIKENIY YKLIKDLLRL PSDIKHYFKG K
```

SEQ ID NO: 8. Nucleotide sequence of coding region for *CstII* from *C. jejuni* O:19.

```
  1 atgaaaaaag ttattattgc tggaaatgga ccaagtttaa aagaaattga
 51 ttattcaagg ctaccaaatg attttgatgt atttagatgt aatcaatttt
101 attttgaaga taaatactat cttggtaaaa aatgcaaagc agtgttttac
151 accccctaatt tcttctttga gcaatactac actttaaaac atttaatcca
201 aaatcaagaa tatgagaccg aactaattat gtgttctaat tacaaccaag
251 ctcatctaga aaatgaaaat tttgtaaaaa cttttttacga ttattttcct
301 gatgctcatt tgggatatga ttttttttaaa caacttaaag aatttaatgc
351 ttattttaaa tttcacgaaa tttatttcaa tcaaagaatt acctcagggg
401 tctatatgtg tgcagtagcc atagccctag gatacaaaga aatttatctt
451 tcgggaattg attttttatca aaatgggtca tcttatgctt ttgataccaa
501 acaagaaaat ctttttaaaac tagcccctga ttttaaaaat gatcgctcgc
551 actatatcgg acatagtaaa aatacagata taaaagcttt agaatttcta
601 gaaaaaactt acaaaataaa actatattgc ttatgtccta atagtctttt
651 agcaaatttt atagaactag cgccaaattt aaattcaaat tttatcatac
701 aagaaaaaaa taactacact aaagatatac tcataccttc tagtgaggct
751 tatggaaaat tttcaaaaaa tattaatttt aaaaaaataa aaattaaaga
801 aaatgtttat tacaagttga taaaagatct attaagatta cctagtgata
851 taaagcatta tttcaaagga aaataa
```


SEQ ID NO: 9: Amino acid sequence of *CstII* from *C. jejuni* O:19.

```
  1 MKKVIIAGNG PSLKEIDYSR LPNDFDVFRC NQFYFEDKYY LGKKCKAVFY
 51 TPNFFFEQYY TLKHLIQNQE YETELIMCSN YNQAHLENEN FVKTFYDYFP
101 DAHLGYDFFK QLKEFNAYFK FHEIYFNQRI TSGVYMCAVA IALGYKEIYL
151 SGIDFYQNGS SYAFDTKQEN LLKLAPDFKN DRSHYIGHSK NTDIKALEFL
201 EKTYKIKLYC LCPNSLLANF IELAPNLNSN FIIQEKNNYT KDILIPSSEA
251 YGKFSKNINF KKIKIKENVY YKLIKDLLRL PSDIKHYFKG K
```


SEQ ID NO: 10. Amino acid sequence of *CstII* from *C. jejuni* strain NCTC 11168

```
            10         20         30         40         50
  1 MSMNINALVC GNGPSLKNID YKRLPKQFDV FRCNQFYFED RYFVGKDVKY
 51 VFFNPFVFFE QYYTSKKLIQ NEEYNIENIV CSTINLEYID GFQFVDNFEL
101 YFSDAFLGHE IIKKLKDFFA YIKYNEIYNR QRITSGVYMC ATAVALGYKS
151 IYISGIDFYQ DTNNLYAFDN NKKNLLNKCT GFKNQKFKFI NHSMACDLQA
201 LDYLMKRYDV NIYSLNSDEY FKLAPDIGSD FVLSKKPKKY INDILIPDKY
251 AQERYYGKKS RLKENLHYKL IKDLIRLPSD IKHYLKEKYA NKNR
```


SEQ. ID NO: 11. Nucleotide sequence for coding region for Cst II from C. jejuni 0:4

```
  1 ATGAAAAAAG TTATTATTGC TGGAAATGGA CCAAGTTTAA AAGAAATTGA TTATTCAAGG
 61 CTACCAAATG ATTTTGATGT ATTTAGATGT AATCAATTTT ATTTTGAAGA TAAATACTAT
121 CTTGGTAAAA AATGCAAAGC AGTGTTTTAC ACCCCTGGTT TCTTCTTTGA GCAATACTAC
181 ACTTTAAAAC ATTTAATCCA AAATCAAGAA TATGAGACCG AACTAATTAT GTGTTCTAAT
241 TACAACCAAG CTCATCTAGA AAATGAAAAT TTTGTAAAAA CTTTTTACGA TTATTTTCCT
301 GATGCTCATT TGGGATATGA TTTTTTTAAA CAACTTAAAG AATTTAATGC TTATTTTAAA
361 TTTCACGAAA TTTATTTCAA TCAAAGAATT ACCTCAGGGG TCTATATGTG TGCAGTAGCC
421 ATAGCCCTAG GATACAAAGA AATTTATCTT TCGGGAATTG ATTTTTATCA AAATGGGTCA
481 TCTTATGCTT TTGATACCAA ACAAGAAAAT CTTTTAAAAC TAGCCCCTGA TTTTAAAAAT
541 GATCGCTCAC ACTATATCGG ACATAGTAAA AATACAGATA TAAAAGCTTT AGAATTTCTA
```

10

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601  GAAAAAACTT ACAAAATAAA ACTATATTGC TTATGTCCTA ACAGTCTTTT AGCAAATTTT
661  ATAGAACTAG CGCCAAATTT AAATTCAAAT TTTATCATAC AAGAAAAAAA TAACTACACT
721  AAAGATATAC TCATACCTTC TAGTGAGGCT TATGGAAAAT TTTCAAAAAA TATTAATTTT
781  AAAAAAATAA AAATTAAAGA AAATGTTTAT TACAAGTTGA TAAAAGATCT ATTAAGATTA
841  CCTAGTGATA TAAAGCATTA TTTCAAAGGA AAA
```

SEQ ID NO: 12. Amino acid sequence of Cst II from C. jejuni 0:4

```
MKKVIIAGNG PSLKEIDYSR LPNDFDVFRC NQFYFEDKYY LGKKCKAVFY TPGFFFEQY
YTLKHLIQNQ EYETELIMCS NYNQAHLENE NFVKTFYDYF PDAHLGYDFF KQLKEFNAY
FKFHEIYFNQ RITSGVYMCA VAIALGYKEI YLSGIDFYQN GSSYAFDTKQ ENLLKLAPD
FKNDRSHYIG HSKNTDIKAL EFLEKTYKIK LYCLCPNSLL ANFIELAPNL NSNFIIQEK
NNYTKDILIP SSEAYGKFSK NINFKKIKIK ENVYYKLIKD LLRLPSDIKH YFKGK
```

SEQ ID NO: 13. Nucleotide sequence for coding region for Cst II from C. jejuni 0:36

```
ATGAAAAAAG TTATTATTGC TGGAAATGGA CCAAGTTTAA AAGAAATTGA TTATTCAAGG
CTACCAAATG ATTTTGATGT ATTTAGATGT AATCAATTTT ATTTTGAAGA TAAATACTAT
CTTGGTAAAA AATGCAAAAC AGTGTTTTAC ACCCCTAATT TCTTCTTTGA GCAATACTAC
ACTTTAAAAC ATTTAATCCA AAATCAAGAA TATGAGACCG AACTAATTAT GTGTTCTAAT
TACAACCAAG CTCATCTAGA AAATGAAAAT TTTGTAAAAA CTTTTTACGA TTATTTTCCT
GATGCTCATT TGGGATATGA TTTTTTTAAA CAACTTAAAG AATTTAATGC TTATTTTAAA
TTTCACGAAA TTTATTTCAA TCAAAGAATT ACCTCAGGGG TCTATATGTG TGCAGTAGCC
ATAGCCCTAG GATACAAAGA AATTTATCTT TCGGGAATTG ATTTTTATCA AAATGGGTCA
TCTTATGCTT TTGATACCAA ACAAGAAAAT CTTTTAAAAC TAGCCCCTGA TTTTAAAAAT
GATCGCTCAC ACTATATCGG ACATAGTAAA AATACAGATA TAAAAGCTTT AGAATTTCTA
GAAAAAACTT ACAAAATAAA ACTATATTGC TTATGTCCTA ATAGTCTTTT AGCAAATTTT
ATAGAACTAG CGCCAAATTT AAATTCAAAT TTTATCATAC AAGAAAAAAA TAACTACACT
AAAGATATAC TCATACCTTC TAGTGAGGCT TATGGAAAAT TTTCAAAAAA TATTAATTTT
AAAAAAATAA AAATTAAAGA AAATGTTTAT TACAAGTTGA TAAAAGATCT ATTAAGATTA
CCTAGTGATA TAAAGCATTA TTTCAAAGGA AAA
```

SEQ ID NO: 14. Amino acid sequence of Cst II from C. jejuni 0:36.

```
MKKVIIAGNG PSLKEIDYSR LPNDFDVFRC NQFYFEDKYY LGKKCKTVFY TPNFFFEQY
YTLKHLIQNQ EYETELIMCS NYNQAHLENE NFVKTFYDYF PDAHLGYDFF KQLKEFNAY
FKFHEIYFNQ RITSGVYMCA VAIALGYKEI YLSGIDFYQN GSSYAFDTKQ ENLLKLAPD
FKNDRSHYIG HSKNTDIKAL EFLEKTYKIK LYCLCPNSLL ANFIELAPNL NSNFIIQEK
NNYTKDILIP SSEAYGKFSK NINFKKIKIK ENVYYKLIKD LLRLPSDIKH YFKGK
```

SEQ ID NO: 15: Nucleotide sequence of glycosyltransferase-encoding ORF 4a of *LOS* biosynthesis locus from *C. jejuni* strain OH4384

```
ATGAAGAAAA TAGGTGTAGT TATACCAATC TATAATGTAG AAAAATATTT   50
AAGAGAATGT TTAGATAGCG TTATCAATCA AACTTATACT AACTTAGAAA  100
TCATACTTGT CAATGATGGT AGCACAGATG AACACTCACT CAATATTGCA  150
AAAGAATATA CCTTAAAAGA TAAAGAATA ACTCTTTTTG ATAAGAAAAA  200
TGGGGGTTTA AGTTCAGCTA GAAATATAGG TATAGAATAC TTTAGCGGGG  250
AATATAAATT AAAAAACAAA ACTCAACATA TAAAAGAAAA TTCTTTAATA  300
GAATTTCAAT TGGATGGTAA TAATCCTTAT AATATATATA AAGCATATAA  350
AAGCTCTCAA GCTTTTAATA ATGAAAAAGA TTTAACCAAT TTTACTTACC  400
CTAGTATAGA TTATATTATA TTCTTAGATA GTGATAATTA TTGGAAACTA  450
AACTGCATAG AAGAATGCGT TATAAGAATG AAAAATGTGG ATGTATTGTG  500
GTTTGACCAT GATTGCACCT ATGAAGACAA TATAAAAAAT AAGCACAAAA  550
AAACAAGGAT GGAAATTTTT GATTTTAAAA AAGAATGTAT AATCACTCCA  600
```

11

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AAAGAATATG CAAATCGAGC ATTAAGTGTA GGATCTAGAG ATATTTCTTT  650
TGGATGGAAT GGAATGATTG ATTTTAATTT TTTAAAGCAA ATTAAACTTA  700
AATTTATAAA TTTTATTATC AATGAAGATA TACACTTTGG GATAATTTTG  750
TTTGCTAGTG CTAATAAAAT TTATGTTTTA TCACAAAGT  TGTATTTGTG  800
TCGTTTAAGA GCAAACAGTA TATCAAATCA TGATAAGAAG ATTACAAAAG  850
CAAATGTGTC AGAGTATTTT AAAGATATAT ATGAAACTTT CGGGGAAAAC  900
GCTAAGGAAG CAAAAAATTA TTTAAAAGCA GCAAGCAGGG TTATAACTGC  950
TTTAAAATTG ATAGAATTTT TTAAAGATCA AAAAAACGAA AATGCACTTG 1000
CTATAAAAGA AACATTTTTA CCTTGCTATG CCAAAAAAGC TTTAATGATT 1050
AAAAAATTTA AAAAAGATCC TTTAAATTTA AAGGAACAAT TAGTTTTAAT 1100
TAAACCTTTT ATTCAAACAA AACTTCCTTA TGATATTTGG AAATTTTGGC 1150
AAAAAATAAA AAATATTTAA                                 1170
```

SEQ ID NO: 16: Nucleotide sequence of β1,4 GalNAc transferase-encoding ORF 5a of *LOS*
biosynthesis locus from *C. jejuni* strain OH4384

```
ATGCTATTTC AATCATACTT TGTGAAAATA ATTTGCTTAT TCATCCCTTT   50
TAGAAAAATT AGACATAAAA TAAAAAAAAC ATTTTTACTA AAAAACATAC  100
AACGAGATAA AATCGATTCT TATTTACCAA AAAAAACTCT TGTGCAAATT  150
AATAAATACA ACAATGAAGA TTTAATTAAA CTTAATAAAG CTATTATAGG  200
GGAGGGGCAT AAAGGATATT TTAATTATGA TGAAAAATCT AAAGATCCAA  250
AATCTCCTTT GAATCCTTGG GCTTTTATAC GAGTAAAAAA TGAAGCTATT  300
ACCTTAAAAG CTTCTCTTGA AAGCATATTG CCTGCTATCC AAAGAGGTGT  350
TATAGGATAT AATGATTGTA CCGATGGAAG TGAAGAAATA ATTCTAGAAT  400
TTTGCAAACA ATATCCTTCA TTTATACCAA TAAAATATCC TTATGAAATT  450
CAAATTCAAA ACCCAAAATC AGAAGAAAAT AAACTCTATA GCTATTATAA  500
TTATGTTGCA AGTTTTATAC CAAAAGATGA GTGGCTTATA AAAATAGATG  550
TGGATCATAT CTATGATGCT AAAAAACTTT ATAAAAGCTT CTATATACCA  600
AAAAACAAAT ATGATGTAGT TAGTTATTCA AGGGTTGATA TTCACTATTT  650
TAATGATAAT TTTTTTCTTT GTAAAGATAA TAATGGCAAT ATATTGAAAG  700
AACCAGGAGA TTGCTTGCTT ATCAATAATT ATAACTTAAA ATGGAAAGAA  750
GTATTAATTG ACAGAATCAA TAACAATTGG AAAAAAGCAA CAAAACAAAG  800
TTTTTCTTCA AATATACACT CTTTAGAGCA ATTAAAGTAT AAACACAGGA  850
TATTATTTCA CACTGAATTA AATAATTATC ATTTTCCTTT TTTAAAAAAA  900
CATAGAGCTC AAGATATTTA TAAATATAAT TGGATAAGTA TTGAAGAATT  950
TAAAAAATTC TATTTACAAA ATATTAATCA TAAAATAGAA CCTTCTATGA 1000
TTTCAAAAGA AACTCTAAAA AAAATATTCT TAACATTGTT TTAA         1044
```

SEQ ID NO: 17: Amino acid sequence of β1,4 GalNAc transferase from *C. jejuni* strain
OH4384 (encoded by ORF 5a of *LOS* biosynthesis locus)

```
              10         20         30         40         50
  1 MLFQSYFVKI ICLFIPFRKI RHKIKKTFLL KNIQRDKIDS YLPKKTLVQI
 51 NKYNNEDLIK LNKAIIGEGH KGYFNYDEKS KDPKSPLNPW AFIRVKNEAI
101 TLKASLESIL PAIQRGVIGY NDCTDGSEEI ILEFCKQYPS FIPIKYPYEI
151 QIQNPKSEEN KLYSYYNYVA SFIPKDEWLI KIDVDHIYDA KKLYKSFYIP
201 KNKYDVVSYS RVDIHYFNDN FFLCKDNNGN ILKEPGDCLL INNYNLKWKE
251 VLIDRINNNW KKATKQSFSS NIHSLEQLKY KHRILFHTEL NNYHFPFLKK
301 HRAQDIYKYN WISIEEFKKF YLQNINHKIE PSMISKETLK KIFLTLF
```

SEQ. ID NO: 18. Nucleotide sequence of β-1,4-GalNAc transferase from C. jejuni 0:1.

```
ATGACTTTGT TTTATAAAAT TATAGCTTTT TTAAGATTGC TTAAAATTGA TAAAAAATTA
AAATTTGATA ATGAATATTT TTTAAACTTA AATAAAAAAA TCTACAATGA AAAGCATAAA
GGTTTTTTTG ATTTTGATCC AAACTCAAAA GATACAAAAT CTCCTTTAAA TCCATGGGCT
TTTATAAGAG TAAAAAATGA AGCCACTACT TTAAGAGTAT CACTTGAAAG TATGTTACCT
GCCATACAAA GAGGTGTTAT AGGATATAAT GATTGTACTG ATGGAAGTGA AGAAATTATT
TTGGAATTTT GCAAACAATA CCCTTCGTTT ATACCAGTAA AATATCCCCA TGAGGTGCAA
ATTGAAAATC CGCAAAGCGA AGAAAATAAA CTTCATAGTT ATTATAACTA TGTAGCTAGT
TTTATACCGC AAGATGAGTG GCTTATAAAA ATAGATGTGG ATCATTACTA TGATGCAAAA
AAATTATATA AGAGTTTTTA TATGGCATCA AAAAATACTG CTGTTAGATT TCCAAGAATT
AATTTTTTAA TACTAGATAA AATTGTAATT CAAAATATAG GAGAATGTGG TTTTATCGAT
GGAGGGGATC AATTGTTAAT TCAAAAGTGC AATAGTGTAT TTATAGAAAG AATGGTTTCA
AAGCAAAGTC AGTGGATTGA TCCTGAAAAA ACTGTGAAAG AATTGTATTC TGAACAGCAA
ATTATACCCA AACATATAAA AATCTTACAA GCAGAATTAC TTCAATGGCA TTTTCCTGCT
TTAAAATATC ATAGAAATGA TTATCAAAAA CATTTGGATG CTTTAACTTT AGAAGATTTT
AAAAAAATCC ATTATAGACA TAGAAAAATA AAGAAAATAA ATTATACAAT GCTTGATGAA
AAAGTAATTC GTGAAATATT AGATAAATTT AAATTGAGTG GTAAAAAAAT GACTTTAGCT
ATAATACCTG CTCGAGCTGG TTCAAAAGGT ATAAAAAATA AAAAATTTAGC TCTTTTGCAT
GATAGGCCTT TGTTGTATTA TACTATCAAT GCAGCAAAAA ATTCAAAGTA TGTAGATAAA
ATTGTTTTAA GTAGTGATGG CGATGATATA TTAGAATATG GACAAACTCA AGGTGTAGAT
GTGTTAAAAA·GACCTAAAGA ATTAGCGCTA GATGATACAA CTAGTGATAA GGTTGTATTG
CATACCTTGA GTTTTTATAA AGATTATGAA AATATTGTTT TATTACAACC CACTTCTCCT
TTAAGGACAA ATGTACATAT AGATGAAGCT TTTTTAAAAT TTAAAAATGA AAACTCAAAT
GCATTAATAA GTGTTGTAGA ATGTGATAAT AAAATTTTAA AAGCTTTTAT AGATGATAAT
GGTAACTTAA AAGGAATTTG TGATAACAAA TATCCATTTA TGCCTAGACA AAAAATTACCA
AAAACTTATA TGAGTAATGG TGCAATTTAT ATAGTAAAGT CAAATTTATT TTTAAATAAC
CCAACTTTTC TACAAGAAAA AACAAGTTGC TATATAATGG ACGAAAAAGC TAGTTTGGAT
ATAGATACAA CAGAGGATTT AAAAAGAGTT AATAATATAA GCTTCTTA
```

SEQ. ID NO: 19. Amino Acid sequence of β-1,4-GalNAc transferase from C. jejuni 0:1.

```
MTLFYKIIAF LRLLKIDKKL KFDNEYFLNL NKKIYNEKHK GFFDFDPNSK DTKSPLNPW
AFIRVKNEAT TLRVSLESML PAIQRGVIGY NDCTDGSEEI ILEFCKQYPS FIPVKYPHE
VQIENPQSEE·NKLHSYYNYV ASFIPQDEWL IKIDVDHYYD AKKLYKSFYM ASKNTAVRF
PRINFLILDK IVIQNIGECG FIDGGDQLLI QKCNSVFIER MVSKQSQWID PEKTVKELY
SEQQIIPKHI KILQAELLQW HFPALKYHRN DYQKHLDALT LEDFKKIHYR HRKIKKINY
TMLDEKVIRE ILDKFKLSGK KMTLAIIPAR AGSKGIKNKN LALLHDRPLL YYTINAAKN
SKYVDKIVLS SDGDDILEYG QTQGVDVLKR PKELALDDTT SDKVVLHTLS FYKDYENIV
LLQPTSPLRT NVHIDEAFLK FKNENSNALI SVVECDNKIL KAFIDDNGNL KGICDNKYP
·FMPRQKLPKT YMSNGAIYIV KSNLFLNNPT FLQEKTSCYI MDEKASLDID TTEDLKRVNNI SFL
```

SEQ. ID NO: 20. Nucleotide sequence of β-1,4-GalNAc transferase from C. jejuni 0:10.

```
ATGCTATTTC AATCATACTT TGTGAAAATA ATTTGCTTAT TCATCCCTTT TAGAAAAATT
AGACATAAAA TAAAAAAAAC ATTTTTACTA AAAAACATAC AACGAGATAA AATCGATTCT
TATCTACCAA AAAAAACTCT TATACAAATT AATAAATACA ACAATGAAGA TTTAATTAAA
CTTAATAAAG CTATTATAGG GGGGGGGCAT AAAGGATATT TTAATTATGA TGAAAAATCT
AAAGATCCAA AATCTCCTTT GAATCCTTGG GCTTTTATAC GAGTAAAAAA TGAAGCTATT
ACCTTAAAAG CTTCTCTTGA AAGCATATTG CCTGCTATTC AAAGAGGTGT TATAGGATAT
AATGATTGCA CCGATGGAAG TGAAGAAATA ATTCTAGAAT TTTGCAAACA ATATCCTTCA
TTTATACCAA TAAAATATCC TTATGAAATT CAAATTCAAA ACCCAAAATC AGAAGAAAAT
AAACTCTATA GCTATTATAA TTATGTTGCA AGTTTTATAC CAAAAGATGA GTGGCTCATA
AAAATAGATG TGGATCATTA TTATGATGCA AAAAAAATTAT ATAAGAGTTT TTATATACCT
AGAAAAAATT ATCATGTAAT TAGTTACTCT AGGATAGATT TTATATTTAA TGAAGAAAAA
TTTTATGTTT ATCGGAATAA GGAGGGGGAG ATTTTAAAAG CTCCTGGAGA TTGTTTAGCA
ATACAAAACA CTAACTTATT TTGGAAAGAA ATACTTATTG AAGATGATAC ATTTAAGTGG
AATACTGCAA AAAATAATAT AGAGAATGCA AAATCATATG AAATTTTAAA AGTTAGAAAT
AGAATTTATT TTACTACAGA ACTTAATAAT TATCATTTTC CATTTATAAA AAATTATAGA
AAAAATGATT ATAAGCAGTT AAATTGGGTT AGCTTAGATG ATTTTATTAA AAATTATAAA
GAAAAATTAA AAAATCAAAT AGATTTTAAA ATGCTAGAAT ACAAAACATT AAAAAAAGTG
TACAAAAAGC TTACATCTTC AGCAAGCGAT AAAATT
```

SEQ. ID NO: 21. Amino acid sequence of β-1,4-GalNAc transferase from C. jejuni 0:1.

```
MLFQSYFVKI  ICLFIPFRKI  RHKIKKTFLL  KNIQRDKIDS  YLPKKTLIQI  NKYNNEDLI
KLNKAIIGGG  HKGYFNYDEK  SKDPKSPLNP  WAFIRVKNEA  ITLKASLESI  LPAIQRGVI
GYNDCTDGSE  EIILEFCKQY  PSFIPIKYPY  EIQIQNPKSE  ENKLYSYYNY  VASFIPKDE
WLIKIDVDHY  YDAKKLYKSF  YIPRKNYHVI  SYSRIDFIFN  EEKFYVYRNK  EGEILKAPG
DCLAIQNTNL  FWKEILIEDD  TFKWNTAKNN  IENAKSYEIL  KVRNRIYFTT  ELNNYHFPF
IKNYRKNDYK  QLNWVSLDDF  IKNYKEKLKN  QIDFKMLEYK  TLKKVYKKLT  SSASDKI
```


SEQ. ID NO: 22. Nucleotide sequence of β-1,4-GalNAc transferase from C. jejuni 0:1. O:36

DNA:
```
ATGCTTAAAA  AAATCATTTC  TTTATATAAA  AGATACTCGA  TTTCTAAAAA  ATTGGTTTTA
GATAATGAGC  ATTTCATTAA  GGAAAATAAA  AACATCTATG  GAAAAAAACA  TAAGGGCTTT
TTTGACTTTG  ATGAAAAGGC  TAAGGATGTG  AAATCACCCC  TTAATCCTTG  GGGATTTATC
AGGGTTAAAA  ATGAAGCTTT  AACCCTAAGA  GTTTCTTTAG  AAAGTATACT  ACCTGCTTTA
CAAAGAGGAA  TTATAGCTTA  CAACGACTGT  GATGATGGGA  GTGAAGAGCT  TATTTTAGAA
TTTTGCAAGC  AATATCCCAA  CTTCATTGCT  AAAAAATATC  CTTATAAAGT  AGATCTAGAA
AATCCTAAAA  ATGAAGAAAA  TAAACTTTAC  TCTTATTACA  ATTGGGCAGC  ATCTTTTATA
CCCTTAGATG  AGTGGTTTAT  AAAAATCGAT  GTGGATCATT  ACTACGATGG  CAAGAAGCTT
TATAAGAGTT  TTTATAGGAT  TGATCAAGAA  AATAAAGCCT  TATGCTACCC  AAGAATTAAT
TTTATAATCT  TAAATGGAAA  TATTTATGTG  CAAAATAGTG  GAAATTATGG  ATTCATAGGG
GGGGGGGATC  AACTCTTGAT  TAAAAGAAGA  AATAGTAGCT  TTATAGAAAG  AAGGGTTTCA  A
AAAAAAGCCA  ATGGATAGAT  CCTAAGGGAC  TTATAGAAGA  ACTCTACTCC  GAGCAACAAG
TCTTATCTCA  AGGAGTGAAA  ATACTACAAG  CTCCCCTACT  TCAGTGGCAT  TTTCCTGCCT
TAAAATACCG  CCGAAACGAT  TACCAACAAT  ATTTAGATAT  CTTGAGTTTA  GAAGAATTTC
AGGCCTTTCA  TCGTAAGAGC  AAAGAGGCTA  AAAAAATAGA  CTTTGCCATG  CTAAAACGCC
CTGTAATCGA  GCAAATATTA  AAGAAATTTC  AAGGAGAGAT  AAAA
```

SEQ. ID NO: 23. Amino acid sequence of β-1,4-GalNAc transferase from C. jejuni 0:36.

```
MLKKIISLYK  RYSISKKLVL  DNEHFIKENK  NIYGKKHKGF  FDFDEKAKDV
KSPLNPWGFI  RVKNEALTLR  VSLESILPAL  QRGIIAYNDC  DDGSEELILE
FCKQYPNFIA  KKYPYKVDLE  NPKNEENKLY  SYYNWAASFI  PLDEWFIKID
VDHYYDAKKL  YKSFYRIDQE  NKALCYPRIN  FIILNGNIYV  QNSGNYGFIG
GGDQLLIKRR  NSSFIERRVS  KKSQWIDPKG  LIEELYSEQQ  VLSQGVKILQ
APLLQWHFPA  LKYRRNDYQQ  YLDILSLEEF  QAFHRKSKEA  KKIDFAMLKR
PVIEQILKKF  QGEIK
```

SEQ. ID NO: 24. Nucleotide sequence of β-1,4-GalNAc transferase from C. jejuni NCTC11168

```
ATGACTTTGT  TTTATAAAAT  TATAGCTTTT  TTAAGATTGC  TTAAAATTGA  TAAAAAATTA
AAATTTGATA  ATGAATATTT  TTTAAACTTA  AATAAAAAAA  TCTACGATGA  AAAGCATAAA
GGTTTTTTTG  ATTTTGATCC  AAACTCAAAA  GATACAAAAT  CTCCTTTAAA  TCCATGGGCT
TTTATAAGAG  TAAAAAATGA  AGCCACTACT  TTAAGAGTAT  CACTTGAAAG  TATGTTACCT
GCCATACAAA  GAGGTGTTAT  AGGATATAAT  GATTGTACTG  ATGGAAGTGA  AGAAATTATT
TTGGAATTTT  GCAAACAATA  CCCTTCGTTT  ATACCAGTAA  AATATCCCCA  TGAGGTGCAA
ATTGAAAATC  CGCAAAGCGA  AGAAAATAAA  CTTCATAGTT  ATTATAACTA  TGTAGCTAGT
TTTATACCGC  AAGATGAGTG  GCTTATAAAA  ATAGATGTGG  ATCATTACTA  TGATGCAAAA
AAATTATATA  AGAGTTTTTA  TATGGCATCA  AAAAATACTG  CTGTTAGATT  TCCAAGAATT
AATTTTTTAA  TACTAGATAA  AATTGTAATT  CAAAATATAG  GAGAATGTGG  TTTTATCGAT
GGAGGGGATC  AATTGTTAAT  TCAAAAGTGC  AATAGTGTAT  TTATAGAAAG  AATGGTTTCA
```

```
AAGCAAAGTC AGTGGATTGA TCCTGAAAAA ACTGTGAAAG AATTGTATTC TGAACAGCAA
ATTATACCCA AACATATAAA AATCTTACAA GCAGAATTAC TTCAATGGCA TTTTCCTGCT
TTAAAATATC ATAGAAATGA TTATCAAAAA CATTTGGATG CTTTAACTTT AGAAGATTTT
AAAAAAATCC ATTATAGACA TAGAAAAATA AAGAAAATAA ATTATACAAT GCTTGATGAA
AAAGTAATTC GTGAAATATT AGATAAATTT AAATTGAGTG GTAAAAAAAT GACTTTAGCT
ATAATACCTG CTCGAGCTGG TTCAAAAGGT ATAAAAAATA AAAATTTAGC TCTTTTGCAT
GATAGGCCTT TGTTGTATTA TACTATCAAT GCAGCAAAAA ATTCAAAGTA TGTAGATAAA
ATTGTTTTAA GTAGTGATGG CGATGATATA TTAGAATATG GACAAACTCA AGGTGTAGAT
GTGTTAAAAA GACCTAAAGA ATTAGCGCTA GATGATACAA CTAGTGATAA GGTTGTATTG
CATACCTTGA GTTTTTATAA AGATTATGAA AATATTGTTT TATTACAACC CACTTCTCCT
TTAAGGACAA ATGTACATAT AGATGAAGCT TTTTTAAAAT TTAAAAATGA AAACTCAAAT
GCATTAATAA GTGTTGTAGA ATGTGATAAT AAAATTTTAA AAGCTTTTAT AGATGATAAT
GGTAACTTAA AAGGAATTTG TGATAACAAA TATCCATTTA TGCCTAGACA AAAATTACCA
AAAACTTATA TGAGTAATGG TGCAATTTAT ATAGTAAAGT CAAATTTATT TTTAAATAAC
CCAACTTTTC TACAAGAAAA AACAAGTTGC TATATAATGG ACGAAAAAGC TAGTTTGGAT
ATAGATACAA CAGAGGATTT AAAAAGAGTT AATAATATAA GCTTCTTA
```

SEQ. ID NO: 25. Amino Acid sequence of β-1,4-GalNAc transferase from C. jejuni NCTC11168

```
MTLFYKIIAF LRLLKIDKKL KFDNEYFLNL NKKIYDEKHK GFFDFDPNSK DTKSPLNPW
AFIRVKNEAT TLRVSLESML PAIQRGVIGY NDCTDGSEEI ILEFCKQYPS FIPVKYPHE
VQIENPQSEE NKLHSYYNYV ASFIPQDEWL IKIDVDHYYD AKKLYKSFYM ASKNTAVRF
PRINFLILDK IVIQNIGECG FIDGGDQLLI QKCNSVFIER MVSKQSQWID PEKTVKELY
SEQQIIPKHI KILQAELLQW HFPALKYHRN DYQKHLDALT LEDFKKIHYR HRKIKKINY
TMLDEKVIRE ILDKFKLSGK KMTLAIIPAR AGSKGIKNKN LALLHDRPLL YYTINAAKN
SKYVDKIVLS SDGDDILEYG QTQGVDVLKR PKELALDDTT SDKVVLHTLS FYKDYENIV
LLQPTSPLRT NVHIDEAFLK FKNENSNALI SVVECDNKIL KAFIDDNGNL KGICDNKYP
FMPRQKLPKT YMSNGAIYIV KSNLFLNNPT FLQEKTSCYI MDEKASLDID TTEDLKRVNN ISFL
```

SEQ ID NO: 26: Nucleotide sequence of β1,3-galactosyltransferase-encoding ORF 6a of LOS biosynthesis locus from C. jejuni strain OH4384

```
ATGTTTAAAA TTTCAATCAT CTTACCAACT TATAATGTGG AACAATATAT   50
AGCAAGGGCA ATAGAAAGCT GTATCAATCA GACTTTTAAA GATATAGAAA  100
TAATTGTAGT TGATGATTGT GGAAATGATA ATAGTATAAA TATAGCCAAA  150
GAATACTCTA AAAAAGACAA AAGAATAAAA ATAATCCACA ATGAAAAAAA  200
CTTAGGTCTT TTAAGAGCAA GATATGAAGG TGTGAAAGTA GCAAACTCTC  250
CTTATATAAT GTTTTTAGAT CCTGATGATT ATTTGGAACT AAATGCTTGT  300
GAAGAGTGTA TAAAAATTTT AGATGAACAG GATGAAGTTG ATTTAGTGTT  350
TTTCAATGCT ATTGTTGAAA GTAATGTTAT TTCATATAAA AAGTTTGACT  400
TTAATTCTGG TTTTTATAGC AAAAAAGAGT TTGTAAAAAA AATTATTGCA  450
AAGAAAAATT TATATTGGAC TATGTGGGGG AAACTTATAA GAAAGAAATT  500
GTATTTAGAA GCTTTTGCGA GTTTAAGACT CGAGAAAGAT GTTAAAATCA  550
ATATGGCTGA AGATGTATTG TTATATTATC CAATGTTAAG TCAAGCTCAA  600
AAAATAGCAT ATATGAACTG TAATTTATAT CATTACGTGC CTAATAATAA  650
TTCAATTTGT AATACTAAGA ATGAAGTGCT TGTTAAAAAT AATATTCAAG  700
AGTTGCAGTT GGTTTTAAAC TATTTAAGGC AAAATTATAT TTAAACAAG  750
TATTGTAGCG TTCTCTATGT GCTAATTAAA TATTTGCTAT ATATTCAAAT  800
ATATAAAATA AAAAGAACAA AATTAATGGT TACATTATTA GCTAAAATAA  850
ATATTTTAAC TTTAAAAATT TTATTTAAAT ATAAAAAATT TTTAAAACAA  900
TGTTAA                                                   906
```

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SEQ ID NO: 27 Amino acid sequence of β1,3-galactosyltransferase encoded by ORF 6a of
LOS biosynthesis locus from C. jejuni strain OH4384

```
             10          20          30          40          50
  1  MFKISIILPT  YNVEQYIARA  IESCINQTFK  DIEIIVVDDC  GNDNSINIAK
 51  EYSKKDKRIK  IIHNEKNLGL  LRARYEGVKV  ANSPYIMFLD  PDDYLELNAC
101  EECIKILDEQ  DEVDLVFFNA  IVESNVISYK  KFDFNSGFYS  KKEFVKKIIA
151  KKNLYWTMWG  KLIRKKLYLE  AFASLRLEKD  VKINMAEDVL  LYYPMLSQAQ
201  KIAYMNCNLY  HYVPNNNSIC  NTKNEVLVKN  NIQELQLVLN  YLRQNYILNK
251  YCSVLYVLIK  YLLYIQIYKI  KRTKLMVTLL  AKINILTLKI  LFKYKKFLKQ
301  C
```

SEQ ID NO: 28. Nucleotide sequence of CgtB β1,3 galactosyltransferase from C. jejuni
serotype O:2 (strain NCTC 11168).

```
ATGAGTCAAA  TTTCCATCAT  ACTACCAACT  TATAATGTGG  AAAAATATAT   50
TGCTAGAGCA  TTAGAAAGTT  GCATTAACCA  AACTTTTAAA  GATATAGAAA  100
TCATTGTAGT  AGATGATTGT  GGTAATGATA  AAAGTATAGA  TATAGCTAAA  150
GAGTATGCTA  GTAAAGATGA  TAGAATAAAA  ATCATACATA  ATGAAGAGAA  200
TTTAAAGCTT  TTAAGAGCAA  GATATGAAGG  TGCTAAAGTA  GCAACTTCAC  250
CTTATATCAT  GTTTTTAGAT  TCTGATGATT  ATTTAGAACT  TAATGCTTGC  300
GAAGAATGTA  TTAAAATTTT  GGATATGGGT  GGGGGGGGTA  AAATTGATTT  350
GTTGTGTTTT  GAAGCTTTTA  TTACCAATGC  AAAAAAATCA  ATAAAAAAAT  400
TAAATATAAA  ACAAGGAAAA  TACAACAACA  AAGAATTTAC  AATGCAAATA  450
CTTAAAACTA  AAAATCCATT  TTGGACAATG  TGGGCTAAAA  TAATCAAAAA  500
AGATATTTAT  TTAAAAGCCT  TCAACATGTT  AAATCTCAAA  AAAGAAATCA  550
AAATAAATAT  GGCAGAAGAT  GCCTTATTAT  ATTATCCTTT  GACAATATTA  600
TCTAATGAAA  TATTTTACTT  AACACAACCT  TTGTATACCC  AGCATGTAAA  650
TAGCAATTCT  ATAACAAATA  ATATTAATTC  TTTAGAAGCT  AATATTCAAG  700
AACATAAAAT  TGTTTTAAAT  GTTTTAAAAT  CAATTAAAAA  TAAAAAAACA  750
CCTCTATATT  TTCTAATTAT  ATATTTATTA  AAAATTCAAT  TATTGAAATA  800
TGAACAAAAT  TTTAATAAAA  GAAATATAAA  TCTTATTTAT  TATAAAATAA  850
ATATTTTATA  TCAAAAATAT  CAATTCAAAT  GGAAAAAATT  TTTATATAAT  900
TTAATTCCGT  AA                                             912
```

SEQ ID NO: 29. Amino acid sequence of CgtB β1,3 galactosyltransferase from C. jejuni
serotype O:2 (strain NCTC 11168).

```
             10          20          30          40          50
  1  MSQISIILPT  YNVEKYIARA  LESCINQTFK  DIEIIVVDDC  GNDKSIDIAK
 51  EYASKDDRIK  IIHNEENLKL  LRARYEGAKV  ATSPYIMFLD  SDDYLELNAC
101  EECIKILDMG  GGGKIDLLCF  EAFITNAKKS  IKKLNIKQGK  YNNKEFTMQL
151  KTKNPFWTMW  AKIIKKDIYL  KAFNMLNLKK  EIKINMAEDA  LLYYPLTILS
201  NEIFYLTQPL  YTQHVNSNSI  TNNINSLEAN  IQEHKIVLNV  LKSIKNKKTP
251  LYFLIIYLLK  IQLLKYEQNF  NKRNINLIYY  KINILYQKYQ  FKWKKFLYNL
301  IP
```

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SEQ ID NO. 30: Nucleotide sequence of β-1,3-galactosyl transferase from C. jejuni O:10

```
ATGTTTAAAA TTTCAATCAT CTTGCCAACT TATAATGTGG AACAATATAT AGCAAGGGCA
ATAGAAAGTT GTATCAATCA GACTTTTAAA AATATAGAAA TAATTGTAGT TGATGATTGT
GGAAGTGACA AAAGTATAGA TATAGTTAAA GAATATGCCA AAAAAGATGA TAGAATAAAA
ATCATACATA ATGAAGAAAA TTTAAAACTT TTAAGAGCTA GATATGAAGG TGTAAAAGTA
GCAAACTCTC CTTATATAAT GTTTTTAGAT CCTGATGATT ATTTAGAACT TAATGCTTGT
GAAGAATGTA TGAAAATTTT AAAAAACAAT GAAATAGATT TATTATTTTT TAATGCATTT
GTATTGGAAA ATAACAATAA AATAGAAAGA AAGTTGAATT TTCAAGAAAA ATGTTATGTA
AAAAAAGATT TTTTAAAAGA ACTATTAAAA ACTAAAAATT TATTTTGGAC AGTGTGGGCA
AAAGTCATAA AAAAAGAATT ATATCTCAAG GCTGTTGGTT TAATATCGGT AGAAAATGCT
AAAATAAATA TGGCTGAAGA TGTTTTATTA TATTACCCTT TGATAAATAT TTCAAATACT
ATATTTCACT TGAGTAAAAA TTTATACAAT TATCAAATAA ATAATTTCTC TATAACCAAA
ACATTAACAT TGCAAAATAT AAAAACAAAT ATACAAGAAC AAGATAATGT TCTATATCTT
CTAAAGAAGA TGCAATATAA TTACAATTTT AACTTAACTT TGCTTAAATT AATTGAGTAT
TTTTTATTAA TTGAAAAATA CTCATTATCA AGCAAGCGAA ATGTTCTTTG TTTTAAAATC
AATATTTTTT TTAAAAAAAT CCAATTTAAA TTTTATCGCT TGCTGAAGAT G
```

SEQ ID NO. 31: Amino acid sequence of β-1,3-galactosyl transferase from C. jejuni O:10

```
MFKISIILPT YNVEQYIARA IESCINQTFK NIEIIVVDDC GSDKSIDIVK EYAKKDDRI
KIIHNEENLK LLRARYEGVK VANSPYIMFL DPDDYLELNA CEECMKILKN NEIDLLFFN
AFVLENNNKI ERKLNFQEKC YVKKDFLKEL LKTKNLFWTV WAKVIKKELY LKAVGLISL
ENAKINMAED VLLYYPLINI SNTIFHLSKN LYNYQINNFS ITKTLTLQNI KTNIQEQDN
VLYLLKKMQY NYNFNLTLLK LIEYFLLIEK YSLSSKRNVL CFKINIFFKK IQFKFYRLLK M
```

SEQ ID NO: 32. Amino acid sequence of lipid A biosynthesis acyltransferase (C. jejuni OH4384).

```
  1 MKNSDRIYLS LYYILKFFVT FMPDCILHFL ALIVARIAFH LNKKHRKIIN
 51 TNLQICFPQY TQKERDKLSL KIYENFAQFG IDCLQNQNTT KEKILNKVNF
101 INENFLIDAL ALKRPIIFTT AHYGNWEILS LAYAAKYGAI SIVGKKLKSE
151 VMYEILSQSR TQFDIELIDK KGGIRQMLSA LKKERALGIL TDQDCVENES
201 VRLKFFNKEV NYQMGASLIA QRSNALIIPV YAYKEGGKFC IEFFKAKDSQ
251 NASLEELTLY QAQSCEEMIK KRPWEYFFFH RRFASYNEEI YKGAK
```

SEQ ID NO: 33. Amino acid sequence of glycosyltransferase encoded by ORF 3a of C. jejuni OH4384 LOS locus.

```
  1 MNLKQISVII IVKNAEQTLL ECLNSLKDFD EIILLNNESS DNTLKIANEF
 51 KKDFANLYIY HNAFIGFGAL KNLALSYAKN DWILSIDADE VLENECIKEL
101 KNLKLQEDNI IALSRKNLYK GEWIKACGWW PDYVLRIFNK NFTRFNDNLV
151 HESLVLPSNA KKIYLKNGLK HYSYKDISHL IDKMQYYSSL WAKQNIHKKS
201 GVLKANLRAF WTFFRNYFLK NGFLYGYKGF IISVCSALGT FFKYMKLYEL
251 QRQKPKTCAL IIITYNQKER LKLVLDSVKN LAFLPNEVLI ADDGSKEDTA
301 RLIEEYQKDF PCPLKHIWQE DEGFKLSKSR NKTIKNADSE YIIVIDGDMI
351 LEKDFIKEHL EFAQRKLFLQ GSRVILNKKE SEEILNKDDY RIIFNKKDFK
401 SSKNSFLAKI FYSLSKKR
```

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SEQ ID NO: 34. Amino acid sequence of glycosyltransferase encoded by ORF 4a of *C. jejuni* OH4384 *LOS* locus.

```
  1 MKKIGVVIPI YNVEKYLREC LDSVINQTYT NLEIILVNDG STDEHSLNIA
 51 KEYTLKDKRI TLFDKKNGGL SSARNIGIEY FSGEYKLKNK TQHIKENSLI
101 EFQLDGNNPY NIYKAYKSSQ AFNNEKDLTN FTYPSIDYII FLDSDNYWKL
151 NCIEECVIRM KNVDVLWFDH DCTYEDNIKN KHKKTRMEIF DFKKECIITP
201 KEYANRALSV GSRDISFGWN GMIDFNFLKQ IKLKFINFII NEDIHFGIIL
251 FASANKIYVL SQKLYLCRLR ANSISNHDKK ITKANVSEYF KDIYETFGEN
301 AKEAKNYLKA ASRVITALKL IEFFKDQKNE NALAIKETFL PCYAKKALMI
351 KKFKKDPLNL KEQLVLIKPF IQTKLPYDIW KFWQKIKNI
```

SEQ ID NO: 35. Amino acid sequence of sialic acid synthase encoded by ORF 8a of *C. jejuni* OH4384 *LOS* locus.

```
  1 MKEIKIQNII ISEEKAPLVV PEIGINHNG SLELAKIMVD AAFSTGAKII
 51 KHQTHIVEDE MSKAAKKVIP GNAKISIYEI MQKCALDYKD ELALKEYTEK
101 LGLVYLSTPF SRAGANRLED MGVSAFKIGS GECNNYPLIK HIAAFKKPMI
151 VSTGMNSIES IKPTVKILLD NEIPFVLMHT TNLYPTPHNL VRLNAMLELK
201 KEFSCMVGLS DHTTDNLACL GAVALGACVL ERHFTDSMHR SGPDIVCSMD
251 TQALKELIIQ SEQMAIMRGN NESKKAAKQE QVTIDFAFAS VVSIKDIKKG
301 EVLSMDNIWV KRPGLGGISA AEFENILGKK ALRDIENDTQ LSYEDFA
```

SEQ ID NO: 36. Amino acid sequence of enzyme involved in sialic acid biosynthesis encoded by ORF 9a of *C. jejuni* OH4384 *LOS* locus.

```
  1 MYRVQNSSEF ELYIFATGMH LSKNFGYTVK ELYKNGFKNI YEFINYDKYF
 51 STDKALATTI DGFSRYVNEL KPDLIVVHGD RIEPLAAAIV GALNNILVAH
101 IEGGEISGTI DDSLRHAISK LAHIHLVNDE FAKRRLMQLG EDEKSIFIIG
151 SPDLELLNDN KISLNEAKKY YDINYENYAL LMFHPVTTEI TSIKNQADNL
201 VKALIQSNKN YIVIYPNNDL GFELILQSYE ELKNNPRFKL FPSLRFEYFI
251 TLLKNADFII GNSSCILKEA LYLKTAGILV GSRQNGRLGN ENTLKVNANS
301 DEILKAINTI HKKQDLFSAK LEILDSSKLF FEYLQSGEFF KLNTQKVFKD
351 IK
```

SEQ ID NO: 37. Amino acid sequence of CMP-sialic acid synthetase encoded by ORF 10a of *C. jejuni* OH4384 *LOS* locus.

```
  1 MSLAIIPARG GSKGIKNKNL VLLNNKPLIY YTIKAALNTK SISKVVVSSD
 51 SDEILNYAKS QNVDILKRPI SLAQDNTTSD KVLLHALKFY KDYEDVVFLQ
101 PTSPLRTNIH IDEAFNLYKN SNANALISVS ECDNKILKAF VCNEYGDLAG
151 ICNDEYPFMP RQKLPKTYMS NGAIYILKIK EFLNNPSFLQ SKTKHFLMDE
201 SSSLDIDCLE DLKKAEQIWK K
```

SEQ ID NO: 38. Amino acid sequence of acetyltransferase encoded by ORF 11a of *C. jejuni* OH4384 *LOS* locus.

```
  1 MEKITLKCNK NILNLLKQYN IYTKTYIENP RRFSRLKTKD FITFPLENNQ
 51 LESVAGLGIE EYCAFKFSNI LHEMDSFSFS GSFLPHYTKV GRYCSISDGV
```

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```
101  SMFNFQHPMD  RISTASFTYE  TNHSFINDAC  QNHINKTFPI  VNHNPSSSIT
151  HLIIQDDVWI  GKDVLLKQGI  TLGTGCVIGQ  RAVVTKDVPP  YAIVAGIPAK
201  IIKYRFDEKT  IERLLKIQWW  KYHFADFYDI  DLNLKINQYL  DLLEEKIIKK
251  SISYYNPNKL  YFRDILELKS  KKIFNLF
```

SEQ ID NO: 39. Amino acid sequence of glycosyltransferase encoded by ORF 12a of *C. jejuni* OH4384 *LOS* locus.

```
  1  MPQLSIIIPL  FNSCDFISRA  LQSCINQTLK  DIEILIIDDK  SKDNSLNMVL
 51  EFAKKDPRIK  IFQNEENLGT  FASRNLGVLH  SSSDFIMFLD  SDDFLTPDAC
101  EIAFKEMKKG  FDLLCFDAFV  HRVKTKQFYR  FKQDEVFNQK  EFLEFLSKQR
151  HFCWSVWAKC  FKKDIILKSF  EKIKIDERLN  YGEDVLFCYI  YFMFCEKIAV
201  FKTCIYHYEF  NPNGRYENKN  KEILNQNYHD  KKKSNEIIKK  LSKEFAHDEF
251  HQKLFEVLKR  EEAGVKNRLK
```